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ABSTRACT

Time-saving strategies are offered for determining appropriateness of assistive technology devices for persons with physical disabilities in movement and posture. The strategies are based on the principle that even an individual with the most severe involvement has certain controllable movements that can form the foundation for interaction with an assistive technology device. A strategy of direct access is discussed first, emphasizing determination of body parts appropriate for access and identifying access aids for use in conjunction with those body parts. A strategy utilizing scanning is then considered, which involves selection of a desired item from a predetermined configuration. The strategy calls for identifying body parts for use with scanning devices, such as hand/arm, head, knee, or foot, and selective matching of movements with switch placement. Therapeutic position priorities are offered that focus on access positions and stabilization. (Contains 12 references.) (JDD)

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DETERMINING DEVICE ACCESS FOR PERSONS WITH PHYSICAL DISABILITIES

ED 380 976

FETC CD-ROM

Session Information

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Session Title: Determining Device Access for Persons with Physical Disabilities

Session #: 107

Session Abstract: Time-savings strategies are offered for determining access to assistive technology devices by persons with physical disabilities in movement and posture. These strategies are based on the principle that even an individual with the most severe involvement has certain controllable movements that can form the foundation for interaction with an assistive technology device. A strategy of direct access receives first consideration. It emphasized a) determining body parts appropriate for access, and b) identifying access aids for use in conjunction with those body parts. A strategy utilizing scanning is considered next. This strategy relies on identifying body parts for use with scanning devices and selective matching of movements with switch placement. Therapeutic jargon is minimized. The presentation should be of interest to professionals from various disciplines.

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Abnormal Postures And People with Disabilities

Persons with physical disabilities exhibit a variety of permanent motor/postural characteristics that often make impossible conventional access to computers and other assistive technology devices (via a finger operated keyboard or mouse). An overview of these physical characteristics and their impact on device access appears in Table 1.

Table 1. Overview of Physical Characteristics

Physical Characteristics	Impact on Device Access
Asymmetrical sitting postures	Fatigue, awkward device access
Abnormal postural reflex activity	Limits eye/hand coordination
Uncontrolled arm movement	Limits finger/hand activation

Device activation may be accomplished by body parts other than fingers (e.g. hand, arm, head, knee, foot), by combining body part movements with appropriate peripherals (e.g., head, chin, mouth, light pointers; finger guard, wrist support). Often, finding the right body part movement/peripheral combination for an individual is accomplished through trial and error. This can be a lengthy, labor intensive process.

A time-saving structured approach is offered that is based on a process of elimination. Two access strategies are explored. Direct access receives first consideration, followed by use of scanning techniques. Finally, therapeutic positioning priorities are offered that focus on assistive technology as the core of the assessment process.

Direct Access Strategy

Direct selection -- first alternative considered.

Body Parts Used For Direct Selection (Arango, McGregor, Fraser, & Kangas, 1994):

1. Fingers (most natural), finger pointer
   Device Equipment:
   - Keyboard (mini, expanded), mouse, trackball

   Aids:
   - Mitten to isolate finger
   - Finger guard
   - Wrist support
   - Wrist rest

2. Head Activation via Pointers
   Device Equipment: Keyboard, picture board

- Head pointer
- Chin pointer
- Mouth pointer

3. Toe (least desirable for direct selection because activation site is too far away from eyes, but may be appropriate.)
   Device Equipment: keyboard, picture board

Activation via scanning should be explored only if these direct selection possibilities are not feasible.

Scanning selection -- second alternative considered. Scanning involves selection of a desired item from a predetermined configuration. The process is time consuming because it involves waiting until the desired item is reached. At this point, the scanning process must be stopped and the desired item selected. Also, scanning is a more difficult task than direct selection -- even for people who are nondisabled (Ratcliff, 1994).

Scanning Access Strategy

Body Parts for Scanning, (Arango, McGregor, Fraser, Kangas, 1994) Switch placement is **key** to activation movements:

1. Hand/arm (first choice -- most natural)
   - Switch placed under or beside palm of hand
   - Switch placed beside back of hand
   - Switch placed inside or outside of forearm
   - Switch placed at back, inside, or outside of elbow

2. Head (second choice)
   - Switch placed under chin
   - Switch placed on forehead
   - Switch placed at side of cheek or temple
   - Switch placed at side of face or jaw
   - Back of head

3. Knee (third choice)
   - Switch place at outside or inside knee, or above knee

4. Foot (least desirable -- too far away from eyes)
   - Switch placed under or above foot
   - Switch placed outside or inside of foot
   - Switch placed anywhere in reach for kicking

Reminder: People with disabilities are consumers of assistive technology and assistive technology services and should be consulted in the assessment process.

Therapeutic Positioning Priorities

For persons with disabilities, effective use of assistive technology should be viewed as the core of therapeutic management. Doing so requires new ways of looking at established concepts and modification of existing therapeutic assessment protocols. Priorities should focus on activities and situations associated with assistive technology device use. Suggestions are offered concerning the prioritization of two basic positioning concepts -- *access positions* and *stabilization*.

Access Positions: (most desirable at top of list)

1. Sitting position, (Fraser, Hensinger, Phelps, 1990) Studies show that people with disabilities demonstrate increased postural control and arm/hand function when seated upright. (Letts, 1991; Myhr & von Wendt, 1991)
2. Supported standing or kneeling.
3. Recumbent positions (e.g. sidelying, supine, prone). Recumbent position (sidelying, supine, and prone) are least desirable positions for device access because device positioning may be difficult and interaction is limited.

Stabilization (most desirable at top of list):
(Stabilization is a support or anchor that secures certain parts of the body for the purpose of gaining increased control in another body part.)

1. Encourage self stabilization. For example, holding on to the edge of a computer keyboard with fingers to gain more controlled use of the thumb.
2. Provide external stabilization if necessary. For example, an arm may be therapeutically positioned via a strap to a wheelchair armrest to gain more control in the other arm.

Note: Consult an occupational or physical therapists regarding therapeutic positioning appropriate for each individual.

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Presentation illustrations from *PCA Physical Characteristic Assessment* by Geralyn Arango, Gail McGregor, Beverly Fraser and Karen Kangas, Copyright 1994, reprinted with permission from Don Johnston Incorporated, publisher. Access strategies are based on dissertation research (Fraser, 1994).

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